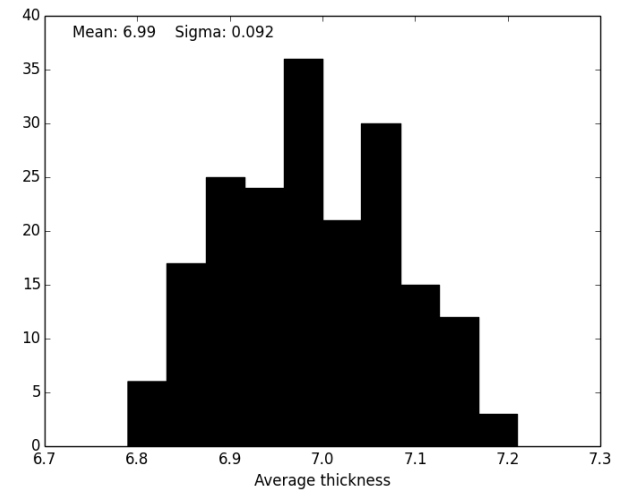
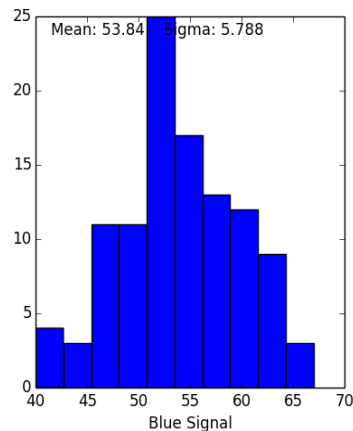
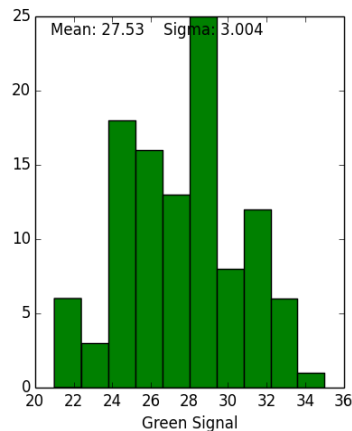
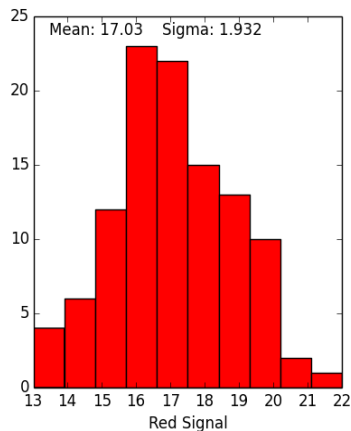


# *HCAL prototype3 testing*

Abhisek Sen

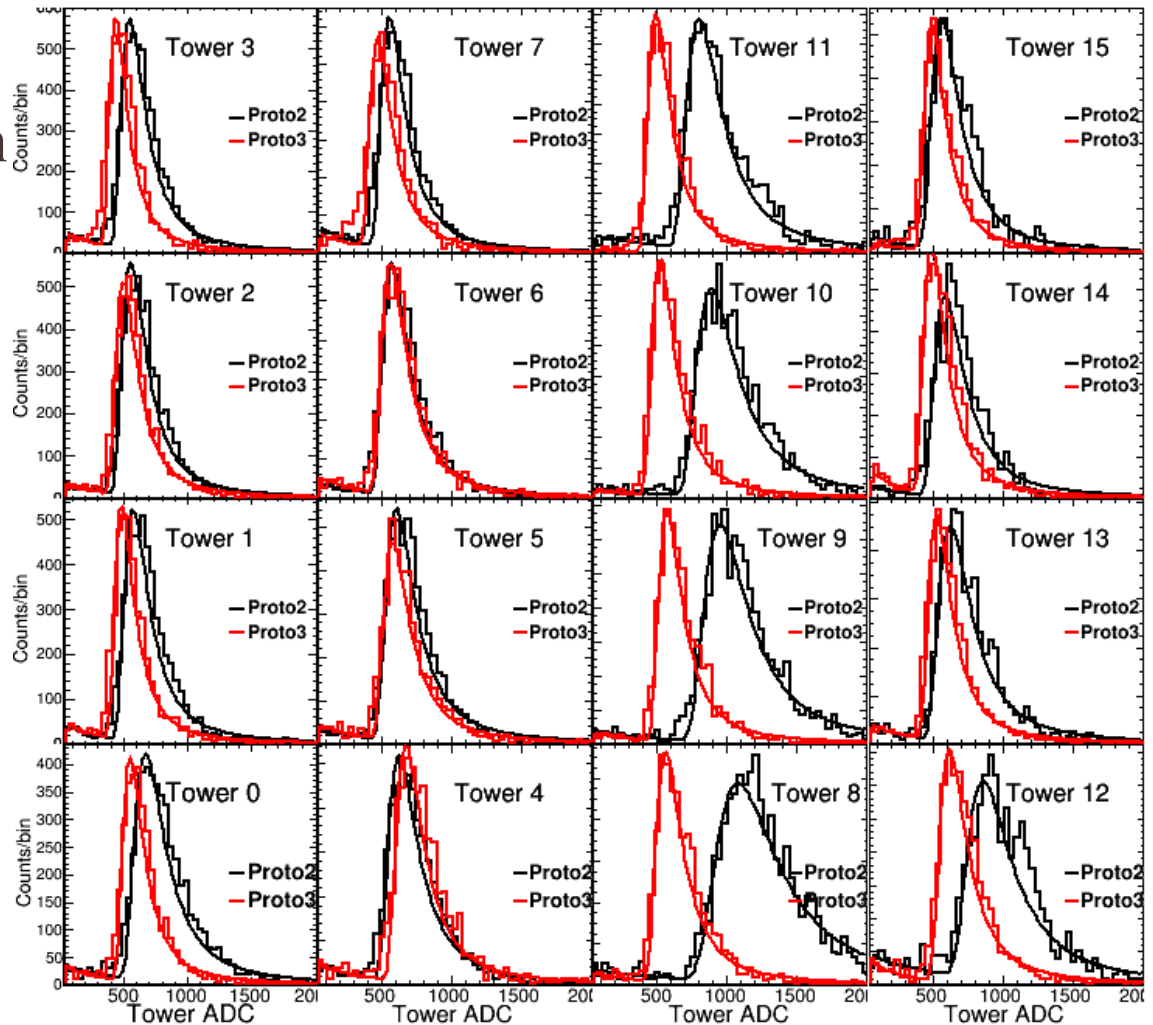
# *Streamlined production*

- HCAL tile production now has been streamlined at Uniplast.
- Increased quality of the tiles.
- Reduced need of testing before installing in the detector.
- Uniplast provided a spreadsheet with individual tile features:
  - Light outputs using red, blue and green LEDs(?)
  - Thickness at 8 locations



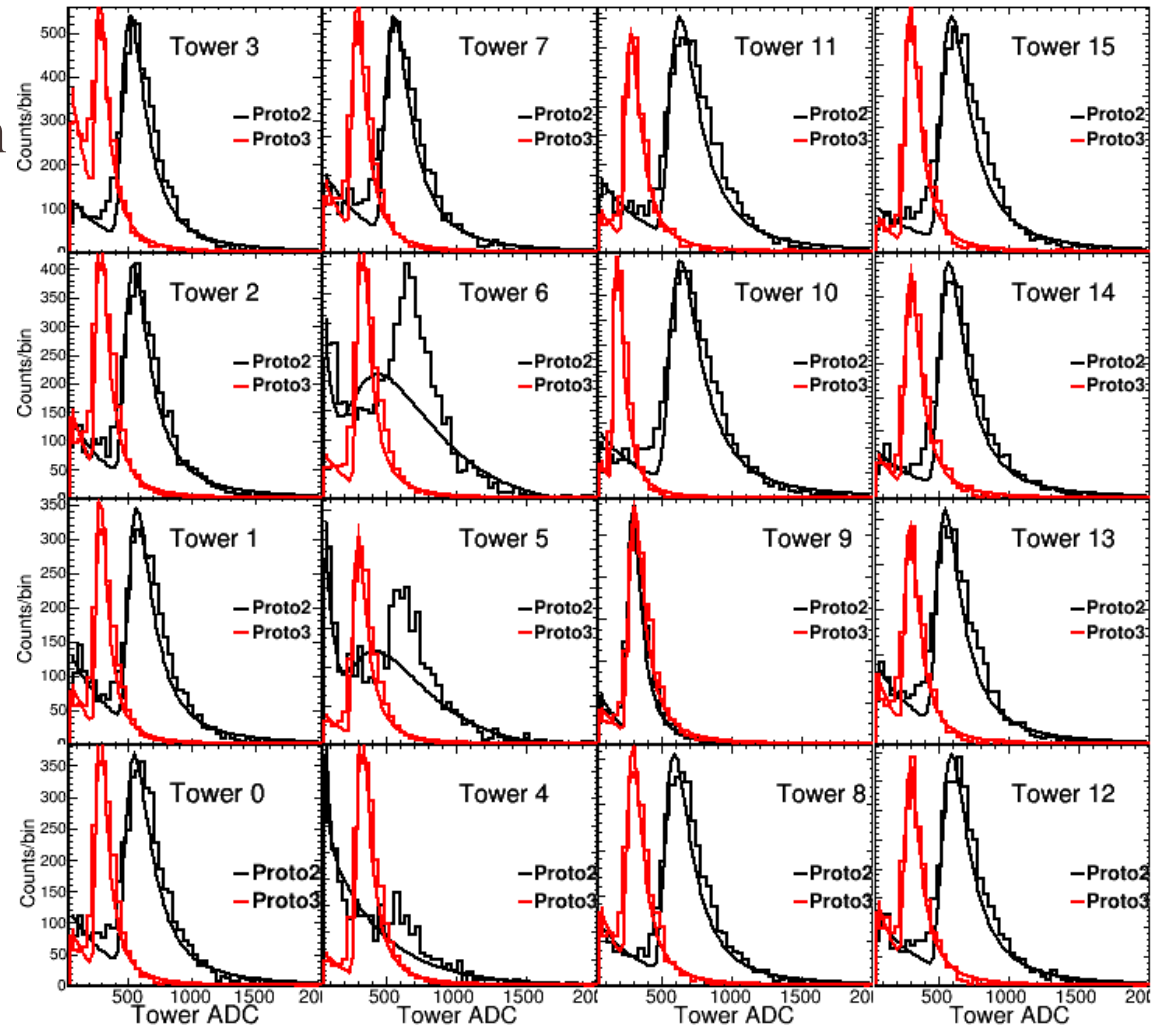
# Prototype 2 vs 3 light outputs (inner)

- Comparison of the light outputs between prototype 2 and 3 for Inner Hcal.
- Externally triggered.
- Lower light output.
- Less tower-to-tower variation of the MIP peaks.



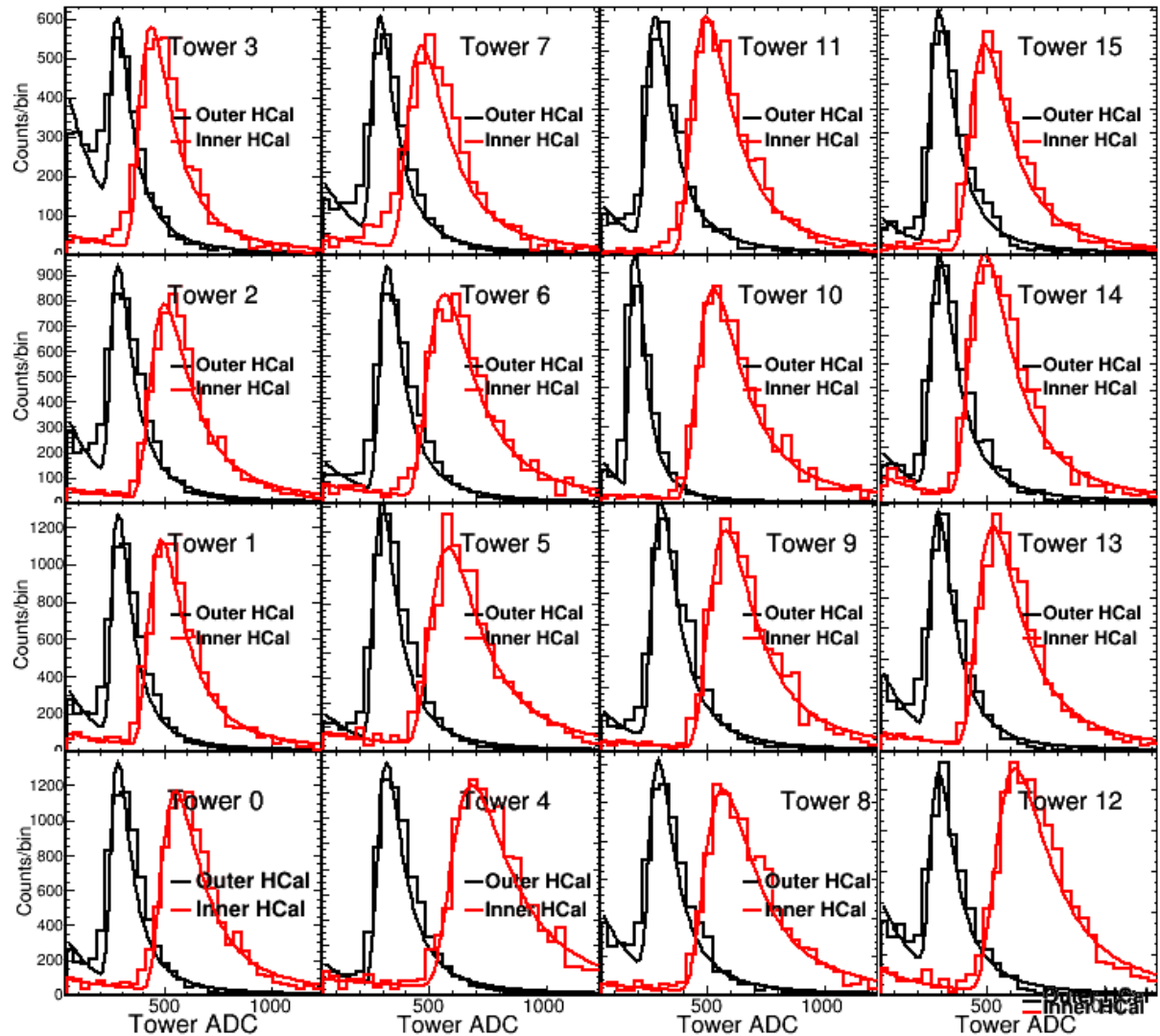
# Prototype 2 vs 3 light outputs (outer)

- Comparison of the light outputs between prototype 2 and 3 for Outer Hcal.
- Externally triggered.
- Lower light output.
- Less tower-to-tower variation of the MIP peaks.



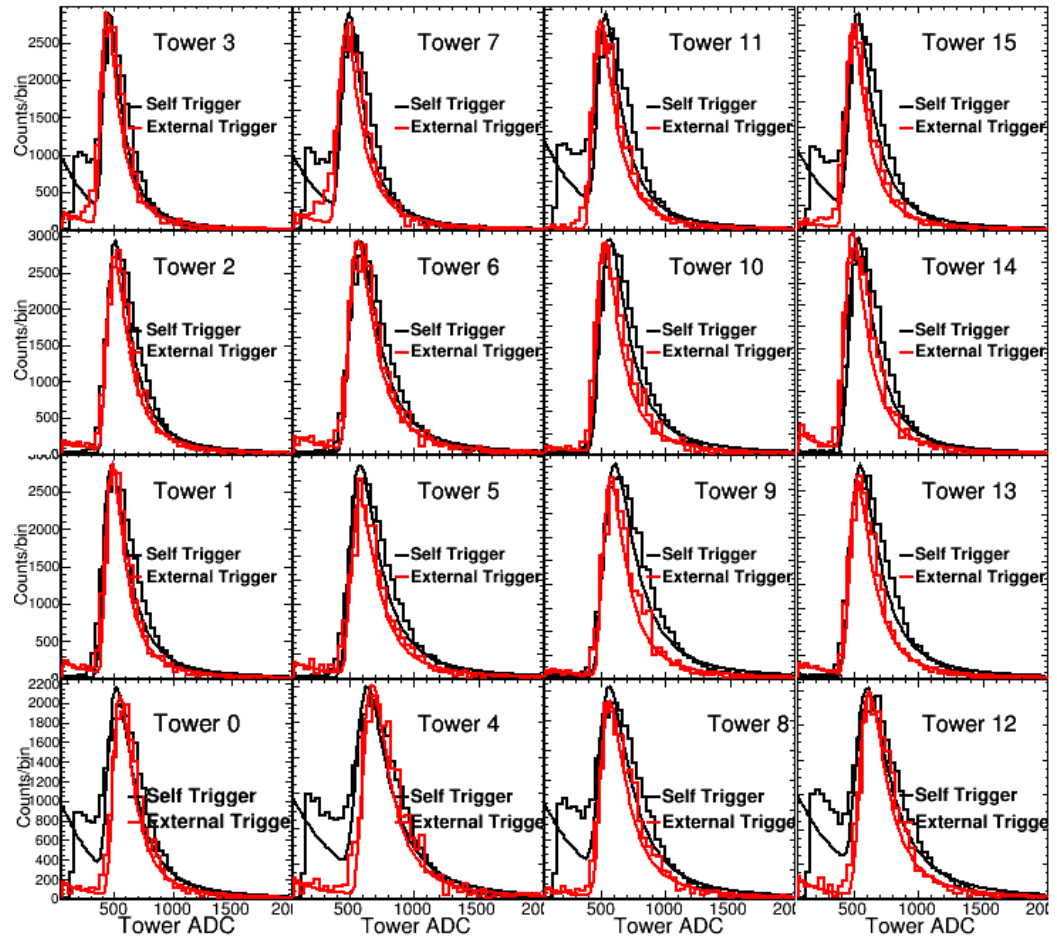
# *Prototype 3: Inner vs Outer HCal*

- Light output comparison between inner and outer HCal.
- Inner HCal  $\sim$  2 x Outer HCal



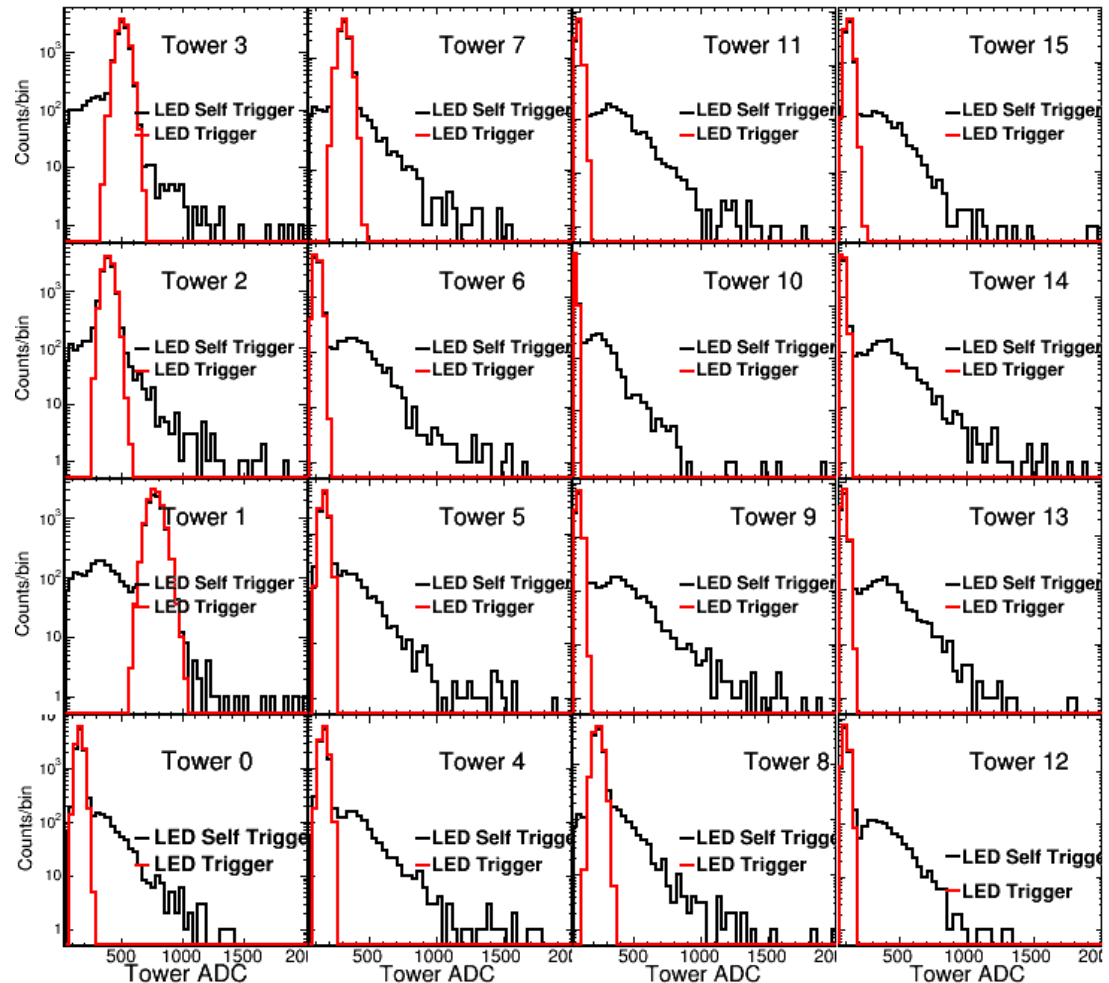
# Self trigger (Inner)

- We recently have been testing self trigger at BNL.
- Configuration:
  - Minimum 3 tower hit ( $\text{ADC} > \text{ADC}_{\text{cut}}$ ).
  - $\text{Sum ADC} > \text{Sum ADC}_{\text{cut}}$
- Good comparison between self and external triggered cosemics.



# *LED self vs LED external (Outer)*

- More checks for self trigger: Comparison of LED external and LED self trigger.
- LED self: Mix of cosmics and LED.
- The peak didn't move.
- Even the lower signal towers didn't get cut off.



# *Analysis goals*

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- ❖ Resolution, linearity
  - HCAL standalone, HCAL+EMCAL
- ❖ Need more understanding of e/pi for the full calorimeter.
- ❖ How to calibrate to e/h  $\sim 1$ ? Optimize jet response.
  - Loose dependence on FNAL Cherenkov counters.
  - Developed an PID algorithm with EMCAL and HCAL energy shower shapes. It can separate electron and hadron events with  $>95\%$  accuracy.